REMARKS

This Amendment responds to the Office Action dated August 21, 2006 in which the Examiner rejected claims 1, 3-4 and 10-12 under 35 U.S.C. §103.

As indicated above, claim 1 has been amended in order to make explicit what is implicit in the claim. The amendment is unrelated to a statutory requirement for patentability.

Claim 1 claims a semiconductor light emitting device comprising a mesa section, an insulating film and an inorganic insulating film. The mesa section has at least a sandwich structure of an n-type clad layer, an active layer and a p-type clad layer which are constituted by compound semiconductor layers formed on a substrate. The insulating film of polyimide covers the mesa section excluding a contact region. The inorganic insulating film has a porous area defined by cylindrical vacancies so as to cover the insulating film excluding the contact region. The inorganic insulating film has a vacancy rate of 50% or more while being oriented substantially in parallel with a surface of the substrate, and the vacancies are arranged at periodic intervals.

Through the structure of the claimed invention a) having an insulating film of polyimide covering the mesa section excluding the contact region and b) having an inorganic insulating film 1) having a porous area defined by cylindrical vacancies, 2) having a vacancy rate of 50% or more while being oriented substantially in parallel with a surface of the substrate and 3) having the vacancies arranged at periodic intervals, as claimed in claim 1, the claimed invention provides a semiconductor light emitting device having a reduced pad capacity and increased modulating speed. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claims 1, 3-4 and 10-12 were rejected under 35 U.S.C. §103 as being unpatentable over *Iwano et al.* (U.S. Patent No. 5,621,750) in view of *Yang et al.* (U.S. Patent No. 6,716,378).

Iwano et al. appears to discloses a surface emission type semiconductor laser for emitting light in a direction perpendicular to the plane of a substrate. (Col. 1, lines 8-10) As shown in FIG. 1, the semiconductor laser 100 comprises a substrate 102 of n-type GaAs, a distributed-Brag reflection type multilayer film mirror (hereinafter called "DBR mirror") 103 including 40 pairs of an n-type $Al_{0.8}$ $Ga_{0.2}$ As layer and an n-type $Al_{0.15}$ $Ga_{0.85}$ As layer alternately deposited one above another, and having a reflectivity of 99.5% or more relative to light having a wavelength equal to about 800 nm, a first clad layer 104 of n-type $Al_{0.7}$ $Ga_{0.3}$ As, a quantum well active layer 105 (which is of multiple quantum well (MQW) structure in this embodiment) including twenty-one pairs of an n^--type GaAs well layer and an n^--type $Al_{0.3}$ $Ga_{0.7}$ As barrier layer, a second clad layer 106 of p-type $Al_{0.7}$ $Ga_{0.3}$ As and a contact layer 109 of p^+-type $Al_{0.15}$ $Ga_{0.85}$ As, these layers being sequentially deposited on the substrate 102 in such an order as described. The contact layer 109 and the upper portion of the second clad layer 106 are etched into a cylindrical column-like portion 114 (hereinafter called "resonator portion", the resonator portion need not necessarily be cylindrical as will be explained later in this text). The resonator portion 114 is buried with a first insulation layer 107 of silicon oxide film (SiO_x film) such as SiO_2 or the like and a second insulation layer 108 of heat-resistant resin such as polyimide or the like. (Col. 14, lines 44-67) The first insulation layer 107 formed of silicon oxide film (SiO_x film) shown in FIG. 1 has a film thickness of 500 to 2000 Angstroms. The

second insulation layer 108 of heat-resistant resin or the like is required to flatten the surface of the element. However, for example, when heat-resistant resins is used heat-resistant resins tend to include residual moisture in the film, and when an element is operated for a long time while such a heat-resistant resin is in direct contact with the semiconductor layer, voids will be produced at the interface between the heat-resistant resin and the semiconductor layer to degrade the characteristics of the element. When a thin film such as the first insulation layer 107 is inserted into the interface between the heat-resistant resin and the semiconductor layer according to one embodiment, the first insulation layer 107, in addition to other advantages, serves as a protective film to prevent such a degradation. (Col. 15, line 55 through Col. 16, line 3).

Thus, *Iwano et al.* merely discloses a first insulation layer 107 formed of silicon oxide film which is continuously formed over the surfaces of the second clad and contact layers 106, 109 and a second insulation film 108 of heat-resistant resin such as polyimide formed to bury the first insulation layer 107. Thus, nothing in *Iwano et al.* shows, teaches or suggests a) an insulation film of polyimide covering a mesa section and b) an inorganic insulating film having a porous area covering the insulating film of polyimide as claimed in claim 1. Rather, *Iwano et al.* teaches away from the claimed invention since the first insulation layer 107 is formed of silicon oxide while the second insulation film is formed of polyimide.

Additionally, *Iwano et al.* only discloses two insulation layer 107, 108, one formed of silicon oxide and one of polyimide. Nothing in *Iwano et al.* shows, teaches or suggests an inorganic insulating film a) having a porous area covered by cylindrical vacancies, b) having the vacancies oriented substantially in parallel with

the surface of a substrate and c) having the vacancies arranged at periodic intervals as claimed in claim 1. Rather, *Iwano et al.* merely discloses a silicon oxide film 107 and a polyimide layer 108 formed on the silicon oxide film.

Yang et al. appears to disclose a low-cost, efficient method of preparing hierarchically ordered structures by filling a mold with a self-assembling mixture of hydrolyzed inorganic species and amphiphilic block copolymers and applying pressure to the mixture. Polymerization of the inorganic species within the mixture results in a mesoscopically structured material having molded features. A mesoporous material can be produced by subsequent thermal removal of the copolymers. (Abstract). A need also exists for forming the hierarchically ordered materials using low-cost, non-toxic, and biodegradable polyalkylene oxide block copolymers. (Column 2, lines 38-40).

Thus, *Yang et al.* merely discloses mesoporous silica. Nothing in *Yang et al.* shows, teaches or suggests an insulating film of polyimide covering a mesa section and an inorganic insulating film covering the insulating film of polyimide as claimed in claim 1. Rather, *Yang et al.* only discloses mesoporous silica.

A combination of *Iwano et al.* and *Yang et al.* would merely suggest to replace the insulating film 108 of polyimide with the mesoporous silica of *Yang et al.* Thus, the combination of *Iwano et al.* and *Yang et al.* does not show, teach or suggest a) an insulating film of polyimide covering a mesa section and b) an inorganic insulating film 1) covering the insulating film, 2) having a porous area defined by cylindrical vacancies, 3) having a vacancy rate of 50% or more, 4) being oriented substantially in parallel with the surface of the substrate and 5) having vacancies arranged at periodic intervals as claimed in claim 1. In other words, the combination of *Iwano et*

al. and *Yang et al.* as suggested by the Examiner, would merely disclose a silicon oxide film 107 of *Iwano et al.* covered by the mesoporous silica of *Yang et al.* Thus, the combination would not disclose an insulating film of polyimide covering the mesa section as claimed in claim 1. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claim 1 under 35 U.S.C. §103.

Claims 3-4 and 10-12 depend from claim 1 and recite additional features. Applicants respectfully submit that claims 3-4 and 10-12 would not have been obvious within the meaning of 35 U.S.C. §103 over *Iwano et al.* and *Yang et al.* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 3-4 and 10-11 under 35 U.S.C. §103.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested. Should the Examiner find that the application is not now in condition for allowance, Applicants respectfully request the Examiner enters this Amendment for purposes of appeal.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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